In the Claims:

Claim 1 (canceled)

Claim 2 (new): An error minimization method for use by a first modem to create a constellation, said method comprising:

training an equalizer to yield tap values;

receiving a sequence including a plurality of segments, each of said plurality of segments having a sign pattern;

arranging said plurality of segments into a plurality of signal vectors;

selecting level estimates to minimize a sum of squared errors, wherein said errors are based on differences between said signal vectors and a product of said tap values, values of said sign pattern and said level estimates; and

defining said constellation based on said level estimates.

Claim 3 (new): The method of claim 2, wherein said product is a product of a matrix formed by said tap values, a matrix formed by said values of said sign patterns and a vector formed by said level estimates.

Claim 4 (new): The method of claim 2, wherein said sequence is a digital impairment learning sequence from a second modem.

Claim 5 (new): The method of claim 4 further comprising:

transmitting information relating to said constellation to said second modem; and

receiving data from said second modem based on said constellation.

Claim 6 (new): The method of claim 2, wherein said equalizer is trained based on a two-point training.

Claim 7 (new): A modem capable of error minimization for creating a constellation, said modem comprising:

an equalizer configured to yield tap values;

a receiver configured to receive a sequence including a plurality of segments, each of said plurality of segments having a sign pattern;

wherein said modem arranges said plurality of segments into a plurality of signal vectors, selects level estimates to minimize a sum of squared errors, wherein said errors are based on differences between said signal vectors and a product of said tap values, values of said sign pattern and said level estimates, and defines said constellation based on said level estimates.

Claim 8 (new): The modem of claim 7, wherein said product is a product of a matrix formed by said tap values, a matrix formed by said values of said sign patterns and a vector formed by said level estimates.

Claim 9 (new): The modem of claim 7, wherein said sequence is a digital impairment learning sequence from a remote device.

Claim 10 (new): The modem of claim 9 further comprising a transmitter configured to transmit information relating to said constellation to said remote device, wherein said receiver receives data from said remote device based on said constellation.

Claim 11 (new): The modem of claim 7, wherein said equalizer is trained based on a two-point training to yield said tap values.

Claim 12 (new): An error minimization method for use by a first modem to create a constellation, said method comprising:

training an equalizer to yield tap values;

receiving a sequence including a plurality of segments, each of said plurality of segments having a sign pattern;

arranging said plurality of segments into a plurality of signal vectors;

selecting level estimates to minimize a sum of squared errors, wherein said errors are based on differences between said signal vectors and a first product of said tap values, values of said sign pattern, said level estimates and error values, wherein said error values are based on differences between said signal vectors and a second product of said tap values, values of said sign pattern and previous or current said level estimates; and

defining said constellation based on said level estimates.

Claim 13 (new): The method of claim 12, wherein said first product is a product of a matrix formed by said tap values, a matrix formed by said values of said sign patterns, a vector formed by said level estimates, and said error values.

Claim 14 (new): The method of claim 12, wherein said sequence is a digital impairment learning sequence from a second modem.

Claim 15 (new): The method of claim 14 further comprising:

transmitting information relating to said constellation to said second modem; and

receiving data from said second modem based on said constellation.

Claim 16 (new): The method of claim 12, wherein said equalizer is trained based on a two-point training.

Claim 17 (new): A modem capable of error minimization for creating a constellation, said modem comprising:

an equalizer configured to yield tap values;

a receiver configured to receive a sequence including a plurality of segments, each of said plurality of segments having a sign pattern;

wherein said modem arranges said plurality of segments into a plurality of signal vectors, selects level estimates to minimize a sum of squared errors, wherein said errors are based on differences between said signal vectors and a first product of said tap values, values of said sign pattern, said level estimates and error values, wherein said error values are based on differences between said signal vectors and a second product of said tap values, values of said sign pattern and previous or current said level estimates, and said modem defines said constellation based on said level estimates.

Claim 18 (new): The modem of claim 17, wherein said first product is a product of a matrix formed by said tap values, a matrix formed by said values of said sign patterns, a vector formed by said level estimates, and said error values.

Claim 19 (new): The modem of claim 17, wherein said sequence is a digital impairment learning sequence from a remote device.

Claim 20(new): The modem of claim 19 further comprising a transmitter configured to transmit information relating to said constellation to said remote device, wherein said receiver receives data from said remote device based on said constellation.

Claim 21 (new): The modem of claim 17, wherein said equalizer is trained based on a two-point training to yield said tap values.